food, seed, and chicken feed were met, 58 per cent of the crop remained to be sold off for cash (Janlekha 1955:53). Almost every inhabitant was engaged in commercial rice farming. A few teachers, craftsmen, and traders, alone did not farm. Plantings of early and late varieties in different plots spread the toil. Cooperative work or some local hired help assured adequate labor forces at the needed moment. Nevertheless, two heavy work seasons dominated the rice cycle. The first of these, June through August, involved soil preparation and transplanting of the seedlings in long straight rows. In the second season, November into February, the rice was harvested, brought home for threshing and winnowing, then sold or stored. The straw was stacked as buffalo feed. People were anxious during the preparatory and planting season, for rains were fickle and the planning and timing had to be exact. Work was hard and almost grim. Harvest, though perhaps more of a physical strain because people cut the stalks by day, then threshed and winnowed far into the night, was gay and so less taxing emotionally, for the crop had safely passed through the threats of flood, drought, and pest, and "cash was in sight." Haste was necessary because each plot of rice had to be harvested within three or four days of its maturity, and because at that season the canals were drying up rapidly, raising the possibility not only that human backs and not boats would move the crop, but that the buyers themselves could not get their boats in to take the main portion to the urban markets. Then a farmer might have to wait until the canals filled again in June to sell his rice and get his money. Since during the busy seasons everyone from age 16 on up was taken up with farming, the cooking, child care, and other chores were carried on by the aged and the very young. These work days taxed to the limit the strength of all men, women, and even young people. Ten to 18 hours might be spent stooping to transplant or weed, or, at harvest, to cut the rice stalk close to the ground. There was a great deal of heavy lifting of seedling bundles or sheaves. The few professional masseurs in the area said they were kept on the run because of back complaints especially during the periods of heavy labor.

In the periods between these two seasons, tools were repaired, houses rebuilt, and ceremonies organized. Extra cash was earned in various ways. People kept very busy, though they did allow themselves more sleep.

The importance of women's role in agriculture is indicated by their virtual equation with men. In every step of rice-production women worked alongside men, plowing with the buffalo, planting, weeding, harvesting, repairing the dikes, hauling, etc. Only uprooting the seedlings was exclusively men's work (even this was done by women elsewhere in Thailand [Kingshill 1960:73]).

Besides the work in rice-fields, women dug and cleaned

SUMMARY

A general description is given of conditions in a 105 Siamese rice village, 1952-54, as they relate to food supply 26 and food habits. Activities at various seasons of the year [220] are described. The heavy work seasons occurred during transplanting and harvest. In the dry season, many ceremonials and festivals were held in which food played an important role. Such occasions provided opportunity to "make merit" and add to one's prestige as did the regular offering of food to the priests, throughout the year. The relatively large financial obligations undertaken by those sponsoring ceremonies was a major factor in the economy of the village.

105 Food was mostly home produced and an important factor 262 in the standard of living was the number of productive hands 433 available. Rice was the first essential for any meal. Home milled rice was used, even in part, only by a minority of households. Fish, fresh or preserved, was the food next in importance to rice. Use of flesh foods other than fish was probably inhibited by Buddhist tenets which prohibit the taking of life, but some poultry, oxen, and other flesh foods [235] were used. Nearly all of the families in Bang Chan raised [433] chickens, and some raised ducks, but about 3/5 of all eggs [244] produced were sold. Every family had some sort of kitchen [245] garden, including banana trees and other plants, but spices [222] and chili were much more commonly grown than vegetables and fruit. Swamp cabbage, the green leafy vegetable used most often, grew wild in the canals. A calendar of fresh foods commonly used in Bang Chan is presented.

[443] Cash expenditures for food were small. When canals were navigable, boat vendors brought produce and during the busy work seasons farmers often bought fish as well as the usual foods: onions, garlic, limes, coconut, palm sugar and small amounts of vegetables.

[434] Many households increased their income by the sale of eggs, vegetables gathered from the canal and other items. [178] Culture of tilapia and mushrooms, begun during the period of study, was undertaken by a considerable number of farmers between 1953 and 1955. Both enterprises were apparently regarded primarily as a supplementary source of cash rather than as a means of improving the home food supply, and both efforts had been largely if not entirely abandoned by 1957.

105 Preparation of some typical dishes, meal service and 264 techniques of eating are described. For adults, two meals a day were usual, except during the busy work seasons when a third meal might be eaten. Menus were similar for all. Two observations from records of school children were 1) that over 90% of them ate snacks, many of which were bought from vendors on the school grounds. Sweets and fruit were the

4

132 Bangkok. The tropical monsoon climate divides the year into three seasons, a hot, wet season from late May to November, a cooler, dry season from December to early February, and a hot, 361 dry season from late February to mid-May. The community, scattered over an area of approximately five square miles, was 161 composed of seven neighboring hamlets. In 1954, the population 162 was approximately 1700, divided among 336 households. About 60 per cent of the households were made up of independent families, parents with unmarried children, with an average family [143] size of 5.7 persons. The main occupation of 80 per cent of all families was rice farming.

243 The climate together with the overflowing Chao Phraya [13] river, provided natural conditions for raising a single crop of wet rice. From May or June to February, the principal activ- [220] ities were those connected with rice production. This crop greatly exceeded the needs for local consumption as human food, [433] feed, and seed. The surplus of rice which was sold, was estimated for 1953 as 1.4 times the amount used for all purposes within the village (Janlekha, 1955).

346 Wat Bang Chan, the Buddhist monastery and place for re- 621 ligious exercises, was also the center of social life in the [795] community. When data for this study were being gathered, the one primary school in the village was located on the grounds of the wat. The community was defined simply by the clientele which patronized Wat Bang Chan and this elementary school. [563] Within the area of the community lived a small minority of Thai Moslems who patronized a mosque and school just outside Bang Chan. The few Chinese in the village were considered as part [028] of the Thai-Buddhist community. Information to be presented on food habits refers primarily to habits of the Buddhist majority, although some reference will be made to ways in which Moslem practices differed therefrom.

133 Although for six or more months of the year the fields 243 were covered with water, sometimes to a depth of a meter or 491 more, a year-round road, connecting Bangkok and Minburi, the 484 nearest market town, ran through one edge of the village. Bus 587 service was available along this road, to either Bangkok or [494] Minburi but within the community one went by boat on the network of canals during the wet season, and during the dry season, [503] on foot along the dikes or across fields. From late January through May, when subsidiary canals were apt to be dry, getting about was somewhat difficult. Boat travel was considered easy, but as many families had only one boat, a trip to the store or even to a neighbor's home had to be planned with reference to the activities of other family members.

443 Large scale purchases, as for a ceremony, were always made at a big market, but in general, instead of people going to the market-town, the "market" came to the people. Boat-venders brought not only fresh produce and staples but also sweets, ices, soft drinks, and cooked foods such as Chinese

Seasonal Activities

128 A chart has been prepared to show the climatic conditions in Bang Chan and what people were doing at different seasons (Chart 1). For convenience, the periods covered by the four rounds of the dietary survey (p. 58) are included.

221 The year starts with May, the beginning of the rice-
132 year. At this time the rains began to soften the parched
241 ground, and the heat slackened. School re-opened. Farmers
512 turned to plowing, harrowing, raising the seedlings. Both
871 sexes worked about equally in field labor, boys from 14 and
462 girls from about 15 years of age performing tasks according
843 to skill and strength. Everyone was in the field at dawn. The buffalo, but not the farmer, rested through the noonday heat (about 10 a.m. until 2 p.m.) and also on the weekly holy
244 day. Meals were usually eaten about 10 a.m. and after returning from the field at dark. Although two meals a day were usual at other times, at this season, some had a third
1264 meal about 2 p.m. If the buffalo were brought home to rest, this meal could be eaten at home, but hired laborers or those working far from home often took with them rice and other foods in a (2)pin-(1)too, or tiered lunch kit.

221 With the rains, the canals had filled, so that by June
132 buyers with big rice boats could return. The few farmers who
501 could afford to hold onto a portion of their last year's crop
443 sold it for a better price at this time. Vegetables and
241 fruits which had died in the long drought were replaced, and trees were planted.

24 In July the heavy transplanting season began. Because
221 of cooperative work habits or hiring out, people worked
132 solidly day after day for two months on their own or on another's fields. It was dawn-to-dark, back-breaking work.

This was an anxious time. The seedlings had to go in at exactly the right time. Water level was only partly con-
1312 trollable. Lack of rain might be remedied by pumping water from the canals but flooding would drown the plants. School
871 vacation was scheduled at this time so both teachers and
857 children could help. Older children might work in the fields,
887 while younger ones, from 8 to 13, and the aged took over the care of babies and toddlers, fished, cooked, gathered food
438 for the family and grass for the buffalo. People knew the crop was subject to drought and flood, pests of rats and worms, destruction by birds or wandering buffalo or duck, and in the end to the mysterious fluctuations of the price of rice on the world market. Moreover, some persons worried about debts, acquired from giving a ceremony or making a capital investment and sometimes from heavy gambling during the rest season.

221
132
243
244
245
262
434
503
496
871

2: Hauck et al. D.E-5 (1952-1954) 1958 AO7 Central Thai AO7 Bang Chan

Chart 1. SEASONAL CYCLE - BANG CHAN, THAILAND, 1953-54

	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Season	→ ←----------WET----------→							←-----COOL------→		←----HOT-----		
Temperature (°C)[1]	30	29	28	29	29	28	26	25	25	28	30	30
Humidity, rel., %	77	80	81	81	80	78	74	70	70	65	66	67
Rainfall	---→ heavy		moderate	←---heavy---→		←------light-----→			←-------negligible--------			
Canals		rising			high	(floods)				lowering fast		low,dry
Cultivation of Rice	plowing-------→ seedbed grown					growing	early var. mature					
			TRANSPLANTING				←---------HARVEST--------→					
School			vacation						vacation			vacation
Cash available Source	cash in hand----------					←-----cash shortage-----→					cash in hand--	
	rice				cash jobs---------→				main rice sale			
Fruit;vegetables	--→ ←-new planting-→								←------annuals die-----			
Fish: Supplies	ponds drained-→								←-----ponds drained-------			
Maturation			←-------many varieties----------→						←---best varieties---→			
Preserving	←----much----→		←----------moderate----------→						←----------most-------→			
Ceremonies	ceremonies-------→		←-----Buddhist Lent-----→								←--ceremonies---	
Dietary survey	--→	←-----Round I------→			←--------Round II--------→			←----Round III----→			←--Round IV-	

1. Mean temperatures and relative humidity estimated from charts for Bangkok and the central plain of Thailand (Bunnag and Dhararak, 1947). Mean monthly temperature range from 25-30°C corresponds to 77-86°F; diurnal variations are greater, averaging 18°F (10°C) in April and 22°F (12°C) in January.

221 435 Despite the availability of fish and of vegetables in the canal, the highest cash outlays for family food occurred in this transplanting season. Several factors probably contributed to this: increased food energy needs because of long hours of work, venders again accessible because of high water, cash from sale of last year's crop still in hand, the convenience of cooked foods and snacks, and perhaps the need to replenish household supplies after the long drought, or after their depletion by a ceremony.

221 [512] The two months of September and October during which the rice grew afforded some respite. People slept a little longer and breakfast was not prepared so early. The skilled cook might take over and could give more attention to food preparation. All who could, took the opportunity to visit [138] and take trips. A few might go on a pilgrimage. Therefore, [240] in this season, all family members were less often together [224] at the evening meal. Fishing was a continuous occupation, [443] with some preserving and home craft. Jobs such as selling [454] food in the market were undertaken for ready cash; houses and equipment were built or repaired. Finally the threshing floor was prepared.

[342] [133] High water caused time-consuming inconvenience only in earth-floored cottages where it was necessary to keep the rice stores and chickens dry, move the cook-stove, and either build plank walks or cook standing ankle deep in water.

243 [221] By November, the earliest varieties of rice matured. Those who owned several rice fields could put at least one into an early type. Many persons, by then short of rice, were glad to be thus tided over. One grandmother divided her first harvest among her several long-since-independent married children; 2 tangs[1] of milled rice per family, 40 for herself.

The heroic labor of harvest occupied December, January, and February. Farmers raced against the all-too-fast lowering of the water in the canals, without which sheaves could [461] not be moved and buyers could not come for the paddy. People worked all daylight hours in the fields, threshed far into [226] the night. At this time also many varieties of fish matured and men fished night after night. Just when the convenience [434] of purchased food was greatest, cash was exhausted. With [426] rice money in sight, venders might be generous with credit, [443] but they could navigate only the larger canals, so were not available to many.

000 There was an important psychological difference between

[804] 1. One tang equals 20 liters. Milled rice weighs about 16 kg. per tang.

There was an important psychological difference between
221 the two work seasons. At planting time, people were anxious;
243 at harvest they were happy. People saw cash just ahead, for
434 the crop was now safe. Each host of a cooperative work party
466 gave at least one big convivial feast, the best he could pro-
527 vide and even the hired laborers got a round of liquor. People
461 joked more than usual at work. Two boat loads of workers were observed racing down a canal at 6 a.m., shouting and cheering, although they had probably worked long hours for days or weeks before. Everyone knew that a joyous season was at hand.

221 When the crop was in, the people rested, fished, and be-
226 gan to prepare for big ceremonies demanding organized work.
527 Supplies of fish were needed for preserving or for feasts. Labor and engines were now available, and with water low, fishponds could be conveniently drained, and the fish on the muddy bottom caught. A pond might be drained two or three times a year, but timing was determined by the availability of equipment and workers and by the needs of the annual ceremonial cycle. One pot of fish was given to each helper at a cooperative pond-draining.

221 Most farmers sold their rice in February. Capital was
45 invested in farm equipment, buffalo, housing and ceremonies. Debts were cleared if possible. Cash expenditures for food, which had declined progressively since the beginning of the rice year, reached the yearly minimum, mostly because people had ample time to fish. People also saved up their money if they were sponsoring a ceremony, ate lightly at home if they
[871] were going to one. Since school closed from March 15 to May 1, because of the heat, money was not given to children for snacks.

221 The land dried up and cracked, rainwater for drinking
132 gave out, and some canals were reduced to mud. Cherished
312 plants were kept alive by watering, but no new planting could
241 be done. Buffalo, which at either seasons were confined and
231 fed, now roamed the fields, nibbling stubble. Everyone was busy and happy. Ordinations, weddings, cremations, merit-making feasts and several big holidays came one after another.
796 Of the four New Year's Days observed in Bang Chan, the Buddhist New Year, which because of the lunar calendar fell about mid-April, was the most important, being celebrated over two days with extensive offerings of food to the priests and with other activities. The official New Year's Day, January 1, and the traditional New Year's Day about November 1, had rather
[563] slight observances. Chinese New Year's, in February, was celebrated by the Chinese residents who presented a school teacher and their hamlet headmen each with a boiled chicken and a Chinese sweet. Lent officially closed the ceremonial season, but the advent of plowing-time slowed the pace considerably.

When the rains finally came, the rice year started again.

GENERAL DESCRIPTION OF FAMILY FARE IN BANG CHAN

As we turn to a detailed description of the family fare, we should like to point out that starvation was unknown in Bang Chan. Although much room remains for improvement in diet, "hollow hunger" was uncommon. In the few times when disastrous flood destroyed the year's crop, the government was able to provide enough rice so that it need not be rationed. People still ate their fill. Even floods had their advantage: one could fish out the window. That gross caloric undernutrition was rare was borne out by examination of the school children (Hauck, 1956). "On the average . . . Bang Chan children could not be considered as markedly underweight. Few were so thin that one could 'count their ribs' and still fewer would be considered plump by American standards." In a random sample of village households that included about 10% of the population, the heaviest man weighed 69 kg. (151.8 pounds) and the heaviest woman 70 kg. (154 pounds). We noted no more than half a dozen adults who appeared to be "overweight." Most were middle aged or older, and none of them did strenuous field work.

Sources of Food

Home Production, Storage and Preservation

Rice. - Rice is an essential part of any Thai meal. The majority of the rice farmers in Bang Chan had rice for home consumption milled for them at Minburi. In general, they took their own paddy to the mill, and brought the resulting milled rice home, where it was stored in a box or mat-bin. Although, according to a recent survey (Goldsen and Ralis, 1957) nearly a third of the households owned a home rice mill, undermilled or home-pounded rice was not widely used in Bang Chan. Information on this point was obtained for 333 of 336 "kitchen-unit"[1] households in the village. Of these 5 consumed home-milled rice only, 51 used home-milled rice in major part, 78 in minor part, and 199 not at all.

In households where home-milled rice was used, during June enough would be pounded to last until harvest, at which time hands were sore and bleeding from the field work and home pounding was impossible. At the time when data for the present report were being gathered, most families took paddy to the mill when water in the canal was high enough so that it could be transported by boat. If a farmer on a subsidiary

---

1. In some large houses, two related family groups lived together but maintained separate kitchens.

273 in 1955 (Goldsen and Ralis, 1957, p. 57) said they drank whiskey often, 22% drank occasionally, 47% seldom, and only 22% said they never drank it.

Sale of Home Produced Foods

433 434 443 Although a majority of the families in Bang Chan made most of their cash income by rice farming, sale of other home produced foods, fish, and food materials such as swamp cabbage and lotus stems which grew wild in the canals was a minor but relatively steady source of income for many families. Six of the 11 families that participated in the dietary [142] study obtained some income from sale of food[1]. The woman frequently had major responsibility for these activities. As noted by Sharp et al. (1953), a few poor families only, added to their income by selling fish.

121 In connection with this study, our concern with sale of home produced foods is primarily with the nutritional rather than the economic aspects,[2] although the two cannot be completely dissociated. Do activities of this sort on the part of some families make a greater variety of foods available to the villagers as a whole? Are some foods sold for cash which from the nutritive standpoint, might well be kept for home use? If so, is the cash thus obtained used to purchase other foods or non-food items? Is the food purchased as useful, from the nutritive standpoint, as that sold? From the standpoint of improving the nutritive value of the diet of Bang Chan families in general, would more home production of fruits, vegetables, fish and eggs by most families be feasible, or should a few families be encouraged to develop these activities on a year round basis, to increase the local supply of food other than rice? Questions of this sort must be considered by anyone attempting to improve food habits in the village.

Annual Calendar of Foods Commonly Used

221 269 125 [125] From the records extending over the period of a year, of foods used by various families participating in the dietary study, and from food records provided by children in the health classes in December 1952, February, May, June, July, September, October and November 1953, and January 1954, a calendar has been constructed showing the approximate times of year at which the foods most commonly used in Bang Chan were available (Chart 2). Foods included in this chart were

---

1. See Table 8, p. 62.

2. See Janlekha (1955).

[Text continues on page 29 -- Analyst]

221 262 [126] [128]

Chart 2. Annual Calendar of Fresh Foods Commonly Used in Bang Chan[1]

	No. Records[1]	May	June	July	Aug.[2]	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.[2]	Apr.[2]
Fish													
Climbing perch	114	x[3]	x	x		x	x	x	x	x	x		
Eels	27	x	x	x		x	x	x		x	x		
Field crab (salted before use)	16	x					x	x		x			
Oysters	22		x	x			x			x			
Notopterus notopterus	10	x						x	x		x		
Serpent head	99	x	x	x		x	x	x	x	x	x		
Silurus	66	x	x	x		x	x	x	x	x	x		
(1)plaa (1)thuu	163	x	x	x		x	x	x	x	x			
Other Animal Foods													
Beef	30	x				x	x	x	x	x	x		
Chicken	72	x	x	x		x	x	x		x			
Eggs	142	x	x	x	x	x	x	x	x	x	x	x	x
Frogs	18	x	x	x				x		x			
Pork	51	x	x	x		x	x	x	x	x	x		

1. Based on 539 records obtained from school children, and observations in 11 households on 44 survey days. Figures in the column headed No. Records indicate the number of 1-day records on which the item appeared.

2. No records were obtained from school children during March, April or August, hence absence of the item from these columns means simply that the 4 households visited in each of these months did not use the item.

3. x indicates that the item appeared frequently on records obtained in this month. Note that frequency of use may be influenced by farm work and circumstances other than relative availability.

Chart 2. (continued)

	No.[1] Records	May	June	July	Aug.[2]	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.[2]	Apr.[2]
Green and Yellow Vegetables													
Basil, sweet		x	x	x	x	x	x	x	x	x	x	x	x
Chili, fresh		x	x	x	x	x	x	x	x	x	x	x	x
(3)Khii-(2)leg	10			x		x	x	x		x			
Lettuce	49	x	x	x		x	x	x		x	x		
(2)Phag (2)ka-(2)cheed[4]	138	x	x	x	x	x	x	x	x	x	x		
Pumpkin	19	x	x	x				x		x	x		
Snap beans	12	x	x	x	x				x	x	x	x	x
Swamp cabbage	147	x	x	x	x	x	x	x	x	x	x	x	
Sweet potato	72			x	x	x	x	x			x		
Other Vegetables													
Bamboo shoots	53	x	x	x	x	x	x	x	x				
Banana, inflorescence	25	x	x	x		x	x	x		x	x		
Calabash	31	x	x	x		x					x		
Cucumber	10		x	x				x			x		
Egg plants[5]	29	x	x	x	x	x	x	x	x	x	x	x	x
Garlic		x	x	x	x	x	x	x	x	x	x	x	x
Gourds, bitter	11			x	x					x			
Gourds, towel	11	x				x	x	x					
Lotus stalks	48	x		x		x	x	x	x				
Mushrooms	25	x	x	x		x	x	x		x			
Onions		x	x	x	x	x	x	x	x	x	x	x	x
West India pea tree flowers	39	x					x	x	x	x	x		

4. Thai names are given when English equivalents are not known. For scientific names see Appendix C, pp. 126-129.

5. Several varieties of egg plant were used. On many records the variety used was not indicated.

221
262
192

Chart 2. (continued)

	No.[1] Records	May	June	July	Aug.[2]	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.[2]	Apr.[2]
Fruits[6]													
Banana[7]	129	x	x	x	x	x	x	x	x	x	x	x	x
Chico	17						x	x					
*Guava	14						x	x		x			
*Jujube	18							x	x	x			
Longan	41			x									
*Limes		x	x	x		x	x	x		x			
*Mango	25		x								x		x
*Orange	48					x	x	x	x				
*Papaya	11			x		x	x	x		x			
*Pineapple	63	x	x	x						x	x		
Rambai	46	x		x								x	
Sandorica	18	x	x										
Singharanut	22						x	x	x	x			
*Star gooseberry	28	x				x					x		
Source of water[8]													
For drinking:													
Rain		x	x	x	x	x	x	x	x	x	x	x	x
Canal										x	x	x	x
Fishpond		x	x									x	x
For food preparation:													
Canal		x	x	x	x	x	x	x	x	x	x	x	x
Fishpond		x										x	x

6. Good sources of ascorbic acid have been marked with an asterisk.

7. Bananas of the (4)nam-(4)waa variety were most commonly used.

8. Data for households participating in the dietary study.

2: Hauck et al. D.E-5 (1952-1954) 1958 AO7 Central Thai AO7
Bang Chan

listed on 10 or more of the 24-hour dietary records obtained. For items which were major ingredients, the number of records on which the item appeared, is given.[1] Thus (1)plaa (1)thuu, which is bought by residents of Bang Chan during the busy work seasons, was used more often than any other single variety of fish named. Of the varieties caught locally, climbing perch, serpenthead, and silurus were most commonly used. Fermented fish, not included in the calendar, appeared on 53 records, and fish with kind not specified, on 180. Eggs were used more often than any animal food other than fish. Among green vegetables, swamp cabbage and (2)phag (2)ka-(2)cheed were commonly used. Bamboo shoots and lotus stalks were prominent among the non-leafy vegetables. Bananas which are grown in every garden and are available all year round were much the most common fruit, although other seasonal fruits were eaten more often in 6 of the 9 months in which school children submitted records.

Some idea may be obtained of peak seasons for use of various common foods by noting the months designed by X. Thus in January and May, serpentheads were listed on about 1/3 of the records, and were frequently served at more than one meal. Sweet potato, usually fried and eaten as a snack, was listed on 35 of 52 records obtained from school children in September. Flowers of the West India pea tree were listed on 10 of 55 records in October, and 12 of 88 in November, with occasional mention on records obtained in 4 other months.

Fruits were eaten much less often than one might expect in a tropical area where many varieties are available and fruit can be grown the year round. They were most often eaten by children as snacks, although pineapple and papaya were usually, and banana occasionally cooked in "with-rice" dishes such as curry. In September, fruit was included in the diets of less than 1/3 of the children. An average of more than one serving of fruit per child per day was recorded in 5 months only, May, June, October, November and February. In May, when (4)ma-(1)faj or rambai was in season 46 of 76 children reported having eaten it. Pineapple, listed by 35 of 61 children in June, was most often served in curry at one or more of the family meals. In October, oranges were eaten by 30 of 55 children who submitted records. Bananas (mostly of the (4)nam-(4)waa variety) topped the list in November and February.

Items mentioned on fewer than 10 records, and hence arbitrarily omitted from the chart, are worth noting as they

---

1. No figures are given for sweet basil, garlic, onions, chili or limes, which were so often used in small amounts as seasoning that the count obtained would give no clear idea of the extent of their use. Some common spice plants were not mentioned on the records.

understood that her merit helped her not to be hungry. Once she asked an eminent layman about eating at night. He said, "If you are not hungry, do not eat. If you feel hungry, it is better to eat. If someone invites you to eat, it is sinful to refuse."

Even young adults had a strong revulsion against gluttony. One of the symptoms of a man who went mad and had to be committed to an institution was that "he ate too much." A woman was despised because "she ate in secret. She stole eggs from her husband, sold them in the market, and then spent the cash on food which she ate there, instead of bringing it home." Definitions of a glutton were, "A 'with-rice' eater," or simply as "one who eats alone." These comments highlight the counsels of eating in moderation and in company. On the other hand, a full stomach was valued for "home is where one eats one's fill."

At maturity, when farm and other tasks were shared as equals, men and women ate almost the same food. The old prescription against animal food for women was somewhat relaxed, but not entirely. To sustain farmers during the seasons of hard work, however, extra quantities of rice and rice alone, were considered essential. "With-rice" was pleasant but not so necessary. Any shift away from a diet of rice as ordinarily cooked in Bang Chan was construed as a shift either in occupation or in health. For example an eminent citizen who gave up farming took to eating (3)khaaw (3)tom often. This soupy rice, a staple dish for infant feeding, had interesting socio-economic connotations. It was served as a light lunch to cooperative farm-workers to be followed at the day's end by a real meal. It was also "delicate" food, suitable for the sick, for city-people, for those who did not toil with their hands and backs. Consequently, when this man ate this "delicate food" more often, he was consciously or unconsciously serving notice on the community that he was not going to do farm work any more, for (3)khaaw (3)tom could not possibly have sustained a farmer's strength. Caustic villagers hinted that he was putting on airs.

Among conditions in which some change from the usual diet was found were pregnancy, post parturition and lactation. Relatively few foods were generally considered to be tabooed under any of these conditions, but many women preferred to limit intake to "safe" foods if there were any possibility that certain foods might cause harm.

"Information was obtained from 42 mothers about the food they ate during the post-partum rest period. Two said they ate as usual, but for the remainder, the diet was considerably

---

1. Literally "beautiful rice." For method of cooking, see p. 33.

252 Another, who had time during Round IV to prepare food twice a
262 day, preferred to prepare more in the morning when she expected
264 to offer food to her son who had just been ordained. In two
518 instances an evening meal was not prepared because the father
[525] and mother had been invited to a feast in connection with an ordination ceremony, on one occasion a mother did not prepare food because she was gambling. In all of these cases, the evening meal at home consisted of leftover rice and other foods prepared earlier. The housewife in Household 215 sometimes received cooked foods from visitors in return for her services as medium, and these were used, together with leftover foods, for the evening meal. The meal patterns of the two groups of families did not appear to differ greatly.

252 Time for Meal Preparation and Number of Dishes Prepared. - In general, the time for meal preparation varied with the number and type of "with-rice" dishes prepared. The "hot" dishes usually required more preparation time than the mild ones, because of the time required to pound spices, and to cut up ingredients. Once-a-day food preparation reduced the time required for cooking. More time was apt to be spent on food preparation when the housewife was least busy with farm work or other work outside the home. Some of the families visited early in Round I had not begun heavy farm work, and in some, children, who were less skilled, did the cooking.

262 Cost of Food Purchased. - The lowest cash expenditure
435 for food by any household on a survey day was 0.12 baht, for
511 a family in Group A, and the highest 16.24 bahts, for a household in Group B (Table 14, p. 78). On a per capita basis, however, the mean cash expenditure for food by Group A households, for all survey days, was slightly higher than for households in Group B (Table 8, p. 62), and no evidence was obtained that in general households in one group tended to spend more for food than households in the other. Despite the wide variation in cash expenditures for food on the survey days, the tendency for cash expenditures for food to decrease in both groups of households as the survey year progressed was apparent. Most of the rice was sold at the end
262 of Round III. The cash went for capital investments, not
432 food, during Round IV. With time to drain ponds and to fish
[221] intensively, and with ceremonies to attend, people did not need to buy fish and meat which were relatively expensive.

146 Caloric and Nutrient Value of Foods Eaten. - The
221 seasonal variation in calorie and nutrient intake of the two groups of families is shown in Table 15. As one would expect,
[221] the average calorie intake was higher during Rounds I and III, when relatively heavy farm work associated with planting and harvesting was under way, than during Round II, which was primarily the growing season for rice, or Round IV, when the harvest was in, and the earth was dry so that preparation for the next planting had not yet begun. Greater consumption of rice in Rounds I and III was largely responsible for the

[Text continues on page 81 --- Analyst]

146 Table 15. Seasonal Variation in the Average per Capita Intake per Day of Calories and Nutrients by Two Groups of Households

	Family Group	Round[1] I	II	III	IV
Calories	A	1906	1560	1752	1708
	B	2262	1757	2156	1862
Protein, gm	A	53	44	48	55
	B	59	49	59	68
Fat, gm	A	15	15	14	13
	B	25	21	19	21
Carbohydrate, gm	A	382	302	349	334
	B	437	334	427	340
Calcium, mg	A	239	84	86	107
	B	343	181	223	128
Phosphorus, mg	A	953	782	734	917
	B	1033	737	960	851
Iron, mg	A	9.0	6.4	5.6	6.6
	B	7.7	7.1	12.5	6.1
Vitamin A, I.U.	A	4414	582	1392	1802
	B	1337	1939	1197	884
Thiamine, mg	A	0.86	0.63	0.59	0.63
	B	0.92	0.57	0.72	0.57
Riboflavin, mg	A	0.61	0.27	0.34	0.24
	B	0.43	0.24	0.27	0.25
Niacin, mg	A	13.2	11.1	9.2	11.8
	B	14.1	9.2	11.7	11.2
Ascorbic acid, mg	A	48	19	21	18
	B	15	45	21	15

1. For dates of Rounds, see Table 7, p. 58.

higher calorie intake in these periods. In general, the level of calories, phosphorus and thiamine and to some extent the protein varied with the rice consumption. The greater consumption of fish when fish ponds were drained during Round IV, accounted for the relatively higher protein content of the diets of both groups at this time, even though calorie intake was not at its peak. During this period, animal foods provided 45 and 53% of the total protein intake of Groups A and B respectively, whereas for the year as a whole, 37 and 40% of the protein intake of these groups was of animal origin.

The relatively high vitamin A and C intakes of families in Group A, during Round I as compared to other periods, was associated with a higher consumption of green leafy vegetables, and the use of sweet potatoes in quantity by one family. During Round II, families in Group A had few green vegetables, and their average intake of vitamin A was very low. The use of papaya, obtained as a gift, by one family in Group B during Round II raised the average ascorbic acid intake for this group substantially. Better average intakes, by one or both groups, of vitamin A, thiamine, riboflavin and calcium during the first Round, were not such as to provide liberal body stores to be called upon when food supplies of these nutrients were low.

SOME RECOMMENDATIONS FOR IMPROVEMENT OF DIET AND NUTRITURE AMONG RESIDENTS OF BANG CHAN

Attempts to improve nutritional status in Bang Chan should be directed both toward increasing the supply and intake of certain nutrients and toward improvement of sanitary conditions so that intestinal infestation, diarrhea and other related illnesses will not lead to needless loss or increased requirement of nutrients.

Solution of the related problems of disposal of human excreta and provision of a year-round safe water supply are in the province of the sanitary engineer. Intestinal parasitism was common, but little can be done through treatment of individuals so long as the water supply is contaminated. Rain water was preferred for drinking, so provision of adequate and sanitary storage for rain water, coupled with sterilization of water from ponds and canals when rain water is not available, would do much to ensure safe drinking water. The custom of giving mother and infant boiled water only, during the post-partum rest period, provides a starting point for extending use of boiled water to other ages and conditions.

4:Phillips E-4,5 (1956-1957) 1966
AO7 Central Thai AO7
Bang Chan

harvest time, serve to create a rite of intensification as family members decide together what work will be done by whom, arise early in the morning to work together happily in the fields—sometimes for as long as fourteen hours at a stretch—and actually see the fruits of their coöperative labor mount up on the threshing floors. The sense of familial solidarity and intradependence, and its associated feelings of love, is experienced by all.[10] Also, since harvesting more often than not involves working reciprocally with other families, the host of a reciprocal labor group giving a feast whenever possible at the end of the day, it serves, although to a lesser extent, to intensify feelings of membership in the larger community.

Summary

In my discussion of the "cultural background," I have dwelt primarily on kinship because the family is functionally the most significant social unit in the village and because it is within the context of kinship that personality is developed and, in Bang Chan, most frequently expressed. None of this is meant to imply a lack of importance for other social units—the monastery, the school, the state—or for the non-institutionalized relationships—friends, drinking partners, and business contacts. However, kinship does provide the basic psychological model for all human relationships in Bang Chan,

[10] Although the annual cycle of Thai peasants is described in detail in the available ethnographies on Thai rural life (deYoung 1955, Fraser 1960, Kaufman 1960, Kingshill 1960, Sharp *et al.* 1953) a few words should be added about the psychological dimensions of this cycle. Thus familial solidarity, intradependence, and love are not the only sentiments that are heightened during the harvest period. Perhaps the most striking quality of this season (December to January) is the increase in the optimism, joy, and general psychic well-being of the villagers: people laugh more loudly than usual; they relish telling about the things they are going to buy; parents take more kindly to the gallivanting of the children. These months contrast with transplanting time (late July to early August) and the period prior to harvest (October to November), when an overabundance of rain can destroy the villagers' rice seedlings or their entire crop. These latter periods are marked not so much by anxiety as by a sense of watchful waiting. All these contrast with the Dry season when things are especially quiet in Bang Chan and when villagers spend their time repairing farming equipment and houses, gossiping, or are working on jobs outside the community. Villagers say that of the three major seasons of the year (Dry, February to June; Rainy, June to January; Cold, January to February) they like the Rainy season best. The season coincides with the rice-growing cycle, is marked by Buddhist Lent and, excepting a final week of Monsoon downpour, is in fact the most comfortable period of the year.

These seasonal activities and attitudes also have direct implications for field work. Thus, while villagers gave freely of their time during the dry season and after the harvest, and during the latter were especially outgoing and benign, many simply would not see me during the weeks of planting and harvesting. The benign attitudes of villagers interviewed after the harvest were reflected directly in the data, as were the noncommittal responses of some villagers who were interviewed during transplanting time.

BANG CHAN

FOREWORD

The Cornell Thailand Project, like other Cornell University studies in community development, is a long term investigation in the field of the processes involved in changing cultural behavior in a non-industrialized society. Field research was begun in 1948 in the central plain of Thailand with base line studies of the rice farming community of Bang Chan and its environs. A collaborating staff of Thai and Americans representing different disciplines has continued to work in Thailand at Bang Chan and elsewhere in a series of phases extending to the present.

The first interim report issued by the Project gives a general account of the economic, political and social organization of Bang Chan in 1948-49 together with some material on health and diet (Sharp et al., 1953). Since the circulation of this first interim report was limited, some of the salient characteristics of Bang Chan should be outlined here.

Bang Chan is located some twenty roadmiles northeast of Bangkok, the rapidly growing major metropolis and capital of Thailand. The village is between two and three miles west of a small district administrative center and market town, Minburi. A century-old canal and to the north of it a post-war hard surface road connect Minburi and Bangkok so that villagers have easy access to these two centers by boat or bus.

In 1954, when data for the present study were still being gathered, the population of Bang Chan was about 1700, divided among about 300 households. Roughly 60 per cent of the households were made up of independent nuclear families consisting of parents and unmarried children. The average size for all families was 5.7 persons. Rice farming was the main occupation of 80 per cent of all families. The population in 1954 worked and lived on about 2800 acres (7000 rai) of land. With the exception of some 120 acres (300 rai) used for the home sites and home gardens scattered along the network of canals in the village, all land was devoted to the cultivation of wet rice. Nutritional density is thus practically the same as population density. Of the rice crop, 60 per cent or more may be sold, the remainder providing seed, feed, and the staple food of the people. During the wet season and into the cooler dry season, from May or June to February, the growing of the single crop of rice is the main activity. The hot dry season from March until the rice planting begins again is a period of fiestas, ceremonies, and visiting.

The Thai countryside is divided into hamlets, each with a headman in charge of the thirty to sixty households of the hamlet. Seven such hamlets constitute the Bang Chan community. (In the Project studies they are identified by the initials BC and KY followed by a number).

235 was slightly higher than that of chickens, averaging 155 eggs per laying duck.

178 231 Hogs: In 1949, two families were raising hogs which according to our observation did not seem to be well fed. When we returned to the village in 1952, not a single hog remained in Bangchan.

Fish

262 443 434 After rice, fish (and other marine animals) are by far the most important ingredient in the diet of Bangchan. More fish are bought from the outside than the very small amount that is exported from the village mainly by one or two very poor families who have availed themselves of this means of augmenting their income.

221 226 The villagers' annual cycle for fish-taking varies somewhat with the particular method used, and with the annual rice and ceremonial cycles: Yet the maturation cycle of the principal types of fish is also a factor, and one which tends to give an overall orderliness to the annual cycle for fish in general. There is no time in the year when at least some fish are not available, nor is there any time in the year, even the busiest, when the family does not want fresh fish for its menu. For this reason, there is fishing the year round, at least in the form of the housewives simply setting nets in the canal and then tending them according to some schedule or whenever the noise of caught fish sloshing about in the water is heard. When a lull from the pressure of

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
Bangchan

221 other activities permits, members of the family are likely
226 to be seen fishing.

The period of late December through February is the period in which the canal fish are mature and most delicious to eat. Notwithstanding that this is the busy harvest time, it is also the busiest catching period, because it is at this time that many of the more important varieties of marine animals mature. Shrimp, for example, is available for only about twenty days during January. While this period is correctly described as the rice harvest time for the community as a whole, almost all individual families are likely to have lulls of a few days between the maturation of one rice variety and another. Such lulls are devoted to intensive fishing.

There is less urgency in the "harvesting" of fish by pool-draining methods than there is in fish-catching. The first pool-draining might occur as early as February, or as late as May; a second and even a third draining might occur later in the year. There are biological factors underlying this, such as the presence on the banks and bases of the pools of a longer-lasting supply of plant food for the fish than is available in the canals, especially since the canals tend to recede more and more as the dry season progresses until, in the higher northern section of the village, they dry up completely well before the onset of the rainy season.

443 she wanted to spend more time collecting debts."

221 433 434 443 261 262 It should be noted that A's brief duration of peddling started in the harvesting season. During this time the village cash supply was high, resulting in demand for such a delicacy as pork which normally constituted a negligible fraction of the diet of Bangchan people. This is a good business period for the peddlers. Another good business period, although not as good as the harvesting time, is in the transplanting season, when farmers are too busy to procure their own food (by fishing). In this latter period, farmers are not particular about food, and "anything eatable sells, provided liberal credit is allowed" for people have neither time nor money.

443 It should be noted also that many smaller peddlers did not go to Bangkok as did Nang A. The small peddlers, who operated on a very limited working capital, had to sell their eggs to larger peddlers at discounted prices. Our records show that only three or four peddlers took regular trips to Bangkok.

427 434 454 621 463 426 Five families were classified as investors in 1953. All these families lived on rents from land, interest on loans, and income from speculative sources such as buying paddy when the price was low and selling it at high prices. Actually, most of these five families were not among large land owners in the village. Their combined land was only 134 rai, averaging only 27 rai per family and ranging from 10 to 76 rai. This is a small acreage in comparison to

*243 Since the farm work usually followed the same pattern for a
461 certain period, it was observed that Phan remembered quite well
+128 the time and the kind of work done by each family worker during the past two or even three days. The time of work was recorded
[231] to the hearest half-hour. In Tables 35 and 35, labor spent by
[464] family workers, piece-workers hired by the family, and buf-
[592] faloes, on different steps in rice production was given in man-hours and buffalo-hours. The dates when these various
[476] jobs started and ended were also given. It should be noted, however, that labor recorded as spent on cooperative work was actually not spent on the family farm but rather on farms of other cooperative members. This was nevertheless exactly compensated by cooperative work on this farm on several occasions which were not entered in the calculation to avoid error because of duplication.

*243 The data from Tables 35 and 36 may be summarized as
461 follow:

• 221 1. Man labor provided by farm staff.

[592] Work started June 4, ended February 14, a total of 248
[464] work days.
[231] Total man-hours spent by farm staff -- 5,478½.

2. Man labor provided by piece-workers.

Work started July 19, ended August 30, a total of 10 work days.
Total man-hours spent by piece-workers -- 229.

3. Animal labor provided by buffaloes.

Work started June 4, ended February 13, a total of 112 work days.
Total buffalo-hours -- 2,119.

[TEXT CONTINUED ON PAGE 246]

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
Bangchan

TABLE 35

SUMMARY OF YEAR ROUND WORK BY CHOM FARM STAFFS
Bangchan, Thailand, 1953

*243
• 221
461
[592]

Steps*	Duration Start	End	Days in work	Man-hrs.
A. Work by Farm Staff				
1. Plowing	June 4	Aug 23	49	918½
2. Harrowing	June 13	Aug 24	28	291
3. Remove weeds after harrow	June 13	Aug 15	25	219½
4. Irrigate and drain	June 4	July 8	21	186½
5. Rolling	June 13	Aug 22	7	42
6. Sow, broadcast	June 18	July 15	13	42½
7. Prepare and repair	July 5	Dec 9	10	106½
8. Prepare bamboo binders	July 17	Aug 27	10	45½
9a. Coop uprooting	July 15	Sept 11	25	127½
9b. Family uprooting	July 17	Sept 8	20	115½
10a. Coop transplanting	July 18	Sept 19	36	267½
10b. Family transplanting	Aug 20	Sept 10	13	125
11. Hauling	July 17	Sept 14	55	733
12. Field inspection	Aug 25	Nov 30	42	87
13a. Care of the plants	July 24	Sept 28	14	114½
13b. Coop weeding	Sept 20	Sept 29	8	86
14. Prepare thresh floor	Nov 29	Jan 27	7	13½
15a. Coop harvesting	Dec 4	Jan 25	44	747½
15b. Family harvesting	Dec 12	Feb 6	18	148½
16. Threshing	Dec 15	Feb 14	43	597
17. Winnowing	Dec 25	Feb 14	9	86½
18. Stacking of straw	Dec 29	Feb 4	2	16
19. Procure grass for buf.	June 14	Nov 27	83	157
20. Supervise coop work	July 22	Jan 24	8	26
21. Entertaining guest workers	July 22	Jan 24	7	158½
Total	June 4	Feb 14	248	5,478½
B. Work by Piece-workers				
1. Coop uprooting	Aug 18	Aug 25	6	24
2. Uprooting	Aug 23	Aug 30	2	45
3. Transplanting	July 19	Aug 2	5	160
Total	July 19	Aug 30	10	229
Grand total	June 4	Feb 14	248	5,707½

[464]

* See details in the section on steps in rice production.

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
Bangchan

TABLE 36

SUMMARY OF YEAR ROUND WORK BY BUFFALOES ON CHOM FARM
Bangchan, Thailand, 1953

243
221
231
461

	Duration Start	End	Days in work	Buf-hrs.
1. Plowing	June 4	Aug 23	49	918½
2. Harrowing	June 13	Aug 24	28	582
3. Rolling	June 13	Aug 22	7	84
4. Hauling	Aug 23	Aug 23	1	8
5. Prepare thresh floor	Nov 30	Dec 4	5	32
6. Threshing	Dec 15	Feb 13	35	494½
Total	June 4	Feb 13	112	2,119

*243 461 • 221

4. Labor requirement per rai.

Our records show that the total area planted to rice was 49 rai.
Therefore, man labor per rai was $\frac{5,707\frac{1}{2}}{49}$ = 116 man-hours.[4]
And animal labor per rai was $\frac{2,119}{49}$ = 43 buffalo-hours.[5]

5. Labor requirement per 100 tang of paddy.

Our records show that a total crop of 2,100 tang of paddy was produced.
Therefore, man labor per 100 tang of paddy was
$\frac{5,707\frac{1}{2}}{2,100}$ X 100 = 272 man-hours
And animal labor per 100 tang of paddy was
$\frac{2,119}{2,100}$ X 100 = 101 buffalo hours.

The Critical Period in Rice Production

*243 221

The entire length of rice producing activities, which in the case under study lasted from June 4, 1953 to February 14 1954, may be subdivided into three distinct phases: (1) cultivation and planting season which lasts from the first day of field work to the date when the seedlings have all been transplanted and properly cared for; (2) flooding season which lasts approximately from the date when the water level has risen up over the dikes to the time when the early varieties of rice are ready to be harvested; and (3) harvesting season which lasts from the harvesting time of the early varieties until all varieties have been harvested, threshed, and winnowed.

Bangchan farmers recognize these three distinct phases which are called in Thai na nar (lit., field season), na nam (lit., water season), and na khao (lit., paddy season). They

4. This would be 290 man-hours per acre.

5. This would be 107½ buffalo-hours per acre.

243 know that they must work hard and spend long hours in the
221 field during na nar which is the critical period during which all steps in rice growing must be finished before the deadline set by the end of this phase. Perfect timing of each step is required because one step is a prerequisite to another. Preparation of the seedbed, for example, is the first thing to be done and must be done as soon as possible, for unless this is finished seeds could not be sown and it takes at least thirty days of good care for the seedlings to attain an appropriate growth so that they may be transplanted onto the fields. During the time the seedlings are being nurtured in the seedbed, the fields must be made ready for transplanting at a certain date set by the age of the seedlings. Normally, seedlings may be transplanted at an age between thirty to fifty days. If they are too young, they would be too weak to stand the uprooting and transplanting processes. Yet, if they are too old, the rate of development after transplanting would be retarded and a poor crop would result. The date of transplanting is also conditioned by the general water level, which is sometimes controllable and is sometimes beyond human control. In transplanting, the water level of the parcel should be about 8-10 inches, and should certainly not exceed the height of the seedlings of about 15 inches. Allowance must be made for the expected rain water, since transplanting time coincides with the period of heaviest rainfalls in September. Normally, the young seedlings are able to survive total submergence for two or three days but they will be drowned by a longer submergence.

*243 Hence, transplanting should be completed some time before the
• 221 whole field is inundated. It is seen, then, that this critical period of na nar is not only one of physical strain on the part of the farmer but also a period of anxieties.

When the rice plants are well established in the fields, they more or less can take care of themselves, for they grow sufficiently rapidly to keep up with the rising water level unless the rise is abnormally rapid. Thus, na nam or the flooding season is a period when farmers have nothing to do except procure grass for the buffaloes. It was earlier indicated that field inspection that was done during this period was actually a pleasure trip to observe the general growth of the rice plants; for even if anything wrong was noticed, nothing could be done about it.

Farmers are busy again when harvesting season starts. Each variety of rice ripens on its exact date and it must be harvested within a day or two. If harvesting is delayed even for a short period of three or four days, the paddy will be over-ripe, resulting in a higher proportion of breakage and hence a lower price. If there is any anxiety at all, it is now over the possibility of rain which may damage the paddy which is left to dry in the field. This is unlikely, however, for the rainy season has just passed. Generally speaking, this
[461] is a period of joy rather than anxiety. The major field work -- harvesting -- although one of the most burdensome field operations consuming one-sixth of the total man labor spent on rice production, is largely a cooperative undertaking carried on

7: Janlekha X-4,5 (1948-1953)1956 AO7 Central Thai AO7
Bangchan

243 under a lively atmosphere. Moreover, the amount of work done
221 depends solely on the amount of human labor utilized. Hence,
461 if the operator wants to finish his harvesting in time when he has not enough available labor, he simply hires more piece-workers. The situation is different in the critical period of cultivation and planting, when the amount of work done depends not only on the amount of labor utilized but also on the accomplishment of the preceding steps which are governed by water condition, weather condition, available equipment, animal labor as well as man labor.

243 In the 1953-54 crop year, it was observed that na nar
221 started on June 4 and ended on September 30, na nam lasted from October 1 to December 3, and na khag from December 4 to February 14.

243 While the figures on total labor requirement in rice
461 production represent valuable information, an earlier discussion in this section has led us to the belief that the mere knowledge that it takes 272 man-hours and 101 buffalo-hours to produce 100 tang of paddy is not enough to demonstrate the labor requirement situation if it is to serve as a guide in problem locating and problem solving. These figures must be further broken down into those required during the critical period and those required in the non-critical period.

243 Our records show that of the 5,707½ man-hours spent
221 in producing 2,100 tang of paddy on Chom Farm, 3,226½ man-
231 hours were utilized in na nar (June 4 to September 30, 119 days),
461 133½ man-hours in na nam (October 1 to December 3, 64 days),

243 and 2,347½ man-hours in na khao (December 4 to February 14, 72
221 days). Similarly, of 2,119 buffalo-hours spent on the same
231 production, 1,592½ were utilized in na nar, 24 in na nang, and
461 502½ in na khao. From these data, we may calculate the averages for daily labor utilization in each period as follow:

1. Na nar (119 days)

Total man-hours, 3,226½; daily man-hours, 27.1
Total buf-hours, 1,592½; daily buf-hours, 13.4

Man-hours per rai, 66.
Buf-hours per rai, 32½.

2. Na nang (64 days)

Total man-hours, 133½; daily man-hours, 2.1
Total buf-hours, 24 ; daily buf-hours, 0.4

Man-hours per rai, 2½.
Buf-hours per rai, ½.

3. Na khao (72 days)

Total man-hours, 2,347½; daily man-hours, 32.6
Total buf-hours, 502½; daily buf-hours, 7.0

Man-hours per rai, 47.
Buf-hours per rai, 10.

It is seen that three-fourths of the total buffalo labor was utilized in na nar. This was to be expected, for most of the steps involving buffalo labor were in this period. It is important to observe that buffaloes assumed an active rol in practically all steps of land preparation -- plowing, harrowing, and rolling. Human labor, on the other hand, played only a passive part in these steps.

243 Table 36 shows that buffaloes were utilized in six
231 steps in rice production -- plowing, harrowing, rolling, haul-
461 ing, preparation of threshing floor, and threshing. These step

243 may be classified according to the way the animals are used
231 as follow:
461

1. Steps in which buffaloes are always used and in constant proportion to men.

Steps	Proportion of buffaloes to men
Plowing	1 to 1
Harrowing	2 to 1
Rolling	2 to 1

2. Steps in which buffaloes are always used but not necessarily in constant proportion to men.

Preparation of threshing floor: Four buffaloes are led by one worker to tramp over the dirt floor which was soaked with water on the previous day. While the buffaloes are tramping over the floor, another worker levels the floor with hoe. The number of buffaloes and workers may be more or may be less, and there is no definite proportion between the animals and men.

Threshing: Four buffaloes are led by one worker to tramp over harvested rice stalks (with paddy still intact) which have been spread over the threshing floor. While the buffaloes are tramping over the rice stalks, two or three other workers separate straw from the threshed paddy with pitchforks.

3. Steps in which buffaloes are not usually used but are sometimes used to minimize human labor when opportunity permits.

Hauling: Two buffaloes are led by two workers to draw the boat carrying seedlings along the muddy water way. Of a total hauling work of 733 man-hours in 55 work days lasting from July 17 to February 14, buffaloes were used only once on August 23, involving only 8 buffalo-hours.

243 Since buffaloes are used in the critical period of
221 ne nar in the three steps where they must be used and used in
231 constant proportion to men, it is not difficult to see that
461 the field work accomplished in this critical period depends more on buffaloes than on human workers. It was mentioned that

243 Chom Farm utilized four buffaloes and four regular workers
221 including the operator himself. Supposing that one buffalo
231 is sick, we might expect that the work accomplished in this
461 period would be reduced to three-fourths. On the other hand, if one regular worker is sick, that would not materially affect the amount of work done, for the sick worker would certainly be replaced by a substitute. Even if no extra family worker is available, it would be only a matter of hours that Chom would be able to recruit one more worker among his relatives and neighbors. He could not recruit a temporary service of a buffalo. If more buffalo labor is badly needed, the only alternative is to purchase the animal. Looking from a different angle, if Chom wants to finish plowing and harrowing ahead of the original schedule for fear of an early inundation, he could not accomplish that by simply utilizing more human labor alone. It is thus seen that buffaloes, more than human workers, are the limiting factor in the accomplishment of the field work during the critical period of cultivation and planting season.

Labor Adjustment Devices

243 Rice plants have one unique quality: each variety will
221 mature on a certain exact date no matter how early or how late it is planted.[6] If there were only one variety of rice in existence, this would be a serious handicap to rice growers, for there would certainly be much more demand for labor in

6. The exceptions are the very early varieties which mature at the age of about 90-100 days. Ripening dates of these varieties are set only by the length of time they have been planted, regardless of the time of the year.

243 harvesting time than could be coped with by the supply for it.
221 Chom Farm, for example, would alone need 916 man-hours in one or two days, during which time approximately the same amount of labor would be needed by each of the other farms. Fortunately, there are in existence hundreds of rice varieties whose maturing dates vary from October to February. These different varieites are grouped into the early, medium, and late varieties according to their ripening dates of October to November, early December to early January, and middle January to middle February, respectively. Usually, the choice of varieties of rice to be grown in a certain locality is so conditioned by local water levels at different periods that a narrower range of selection is forced. Thus, the earliest variety in Bangchan is harvested in early December and the latest in middle February. The terms "early," "medium," and "late" are also arbitrarily used by local people to denote the relative ripening dates of locally grown varieties. Thus, in Bangchan the varieties ripening in early and middle December are known as the early varieites, those ripening between late December and middle January the medium varieties, and those ripening in late January and after the late varieties. It is possible, then, that the same variety may be called an early variety in one place and a medium or even a late variety in another.

243 By growing several varieties of different ripening
221 dates, a farmer is able to spread out labor required in har-
461 vesting. In the same manner, labor required in uprooting and transplanting is spread out by sowing these seeds at different

243 times. Using too many varieties of rice on a farm, however,
221 will complicate the working schedule; and sowing times of these
461 varieties cannot also be spread out too far apart because seedlings should all grow up to the size appropriate for transplanting some time before the deadline set by the water level. It has been observed that most farmers grow from three to six varieties on their farms.

243 Another efficient device for spreading out labor is
221 that of farmers in a locality organizing themselves into
461 informal cooperative work groups to perform on a mutual help
467 basis such field work which can be best cooperatively done, such as uprooting, transplanting and harvesting. There were three cooperative work groups in Bangchan: (1) Mu Sapan Yao, or the Bridge Group, consisting of farm operating families living in the vicinity of the bridge across Bangchan Canal; (2) Mu ha Wat, or the Near Wat Group, consisting of families living around Wat Bangchan; and (3) Mu Bon, or the North Group, consisting of families living in Upcanal Bangchan. The organization and the system for labor compensation of these various informal work cooperatives will be discussed in the next section.

Cooperative Work

243 There were five kinds of cooperative work in Bangchan --
476 cooperative uprooting, cooperative transplanting, cooperative harvesting, cooperative weeding, and cooperative pounding of cargo rice. While the first three kinds were important undertakings through which a major part of those rice production

7: Janlekha X-4.5 (1948-1953)1956 AO7 Central Thai AO7
Bangchan

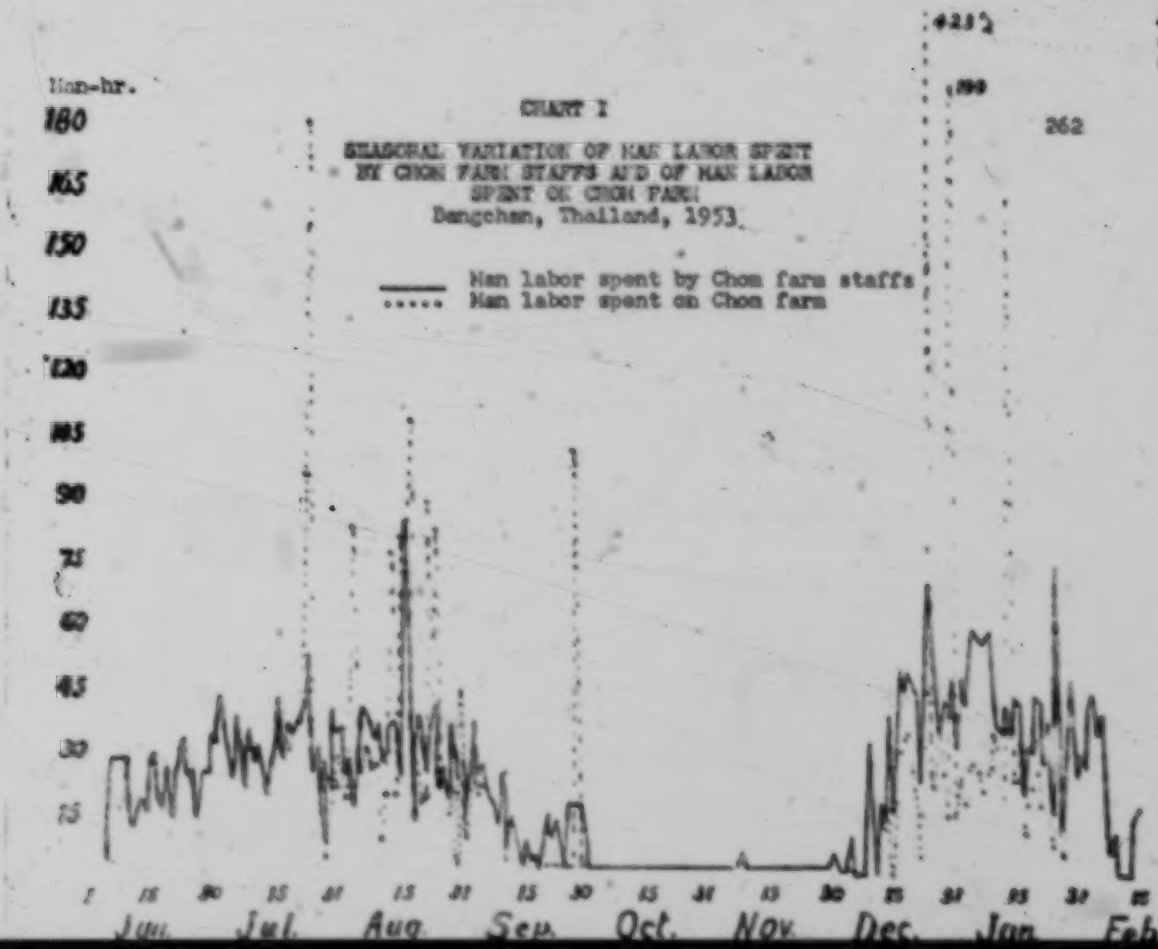

CHART I

SEASONAL VARIATION OF MAN LABOR SPENT BY CHON FARM STAFFS AND OF MAN LABOR SPENT ON CHON FARM
Bangchan, Thailand, 1953

——— Man labor spent by Chon farm staffs
..... Man labor spent on Chon farm

263
•243
• 221
231
461

7: Janlekha X-4,5 (1948-1953)1956 AO7 Central Thai AO7
Bangchan

CHART II

SEASONAL VARIATION OF BUFFALO LABOR SPENT ON CHOM FARM
Bangchan, Thailand, 1953

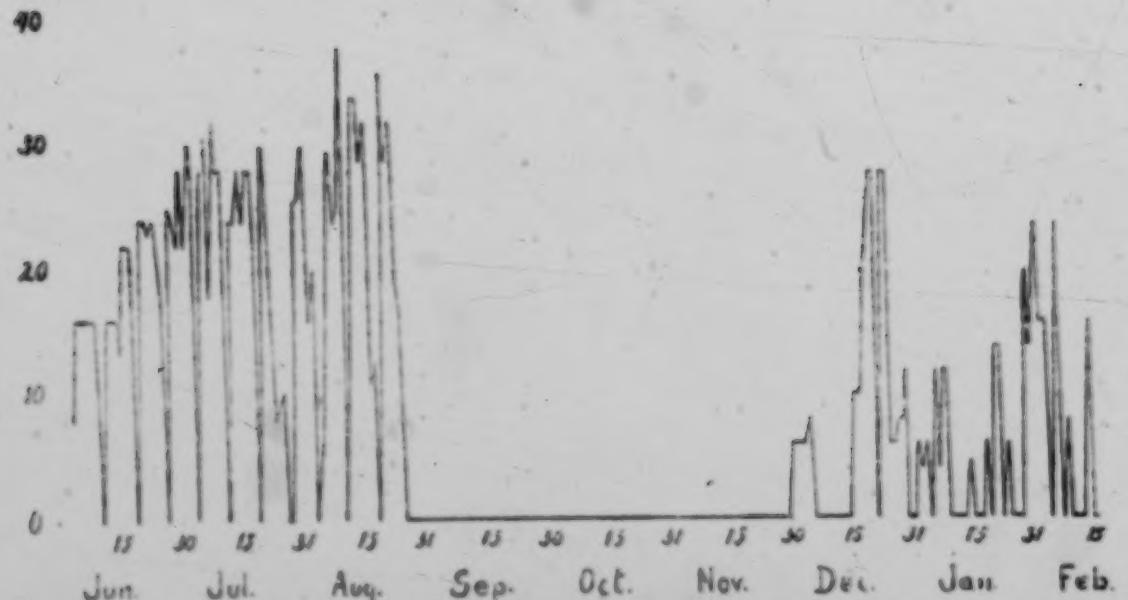

TABLE 37

DAILY LABOR SPENT BY CHOW FARM STAFFS
Bangchan, Thailand, 1953

Date		Animal labor	Human labor		
			On farm	On coop. work	Total
		buf-hr	man-hr	man-hr	man-hr
Jun	4	8	24	--	24
	5	16	28	--	28
	6	16	28	--	28
	7	16	28	--	28
	8	16	28	--	28
	9	16	28	--	28
	10	8	12	--	12
	11	--	16	--	16
	12	16	18	--	18
	13	16	15½	--	15½
	14	16	27½	--	27½
	15	13½	29	--	29
	16	22	19½	--	19½
	17	22	16½	--	16½
	18	20	26½	--	26½
	19	--	14½	--	14½
	20	24	25	--	25
	21	24	24	--	24
	22	23	33	--	33
	23	24	24	--	24
	24	21½	25½	--	25½
	25	18	14	--	14
	26	--	18½	--	18½
	27	25	25	--	25
	28	24	25	--	25
	29	22	34½	--	34½
	30	28	32	--	32
July	1	22	43	--	43
	2	30	38	--	38
	3	27½	30	--	30
	4	--	23	--	23
	5	28	38	--	38
	6	30½	32½	--	32½
	7	18	21	--	21
	8	32	35	--	35
	9	28	28	--	28
	10	28	3-½	--	30½

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
Bangchan

TABLE 37 (Cont.)

DAILY LABOR SPENT BY CHOM FARM STAFFS

243
221
231
461
476
592

Date		Animal labor	Human labor		
			On farm	On coop. work	Total
		buf-hr	man-hr	man-hr	man-hr
July	11	--	23½	--	23½
	12	24	20	--	20
	13	24	26½	--	26½
	14	28	31	--	31
	15	24	38	5½	43½
	16	28	27½	--	27½
	17	28	36	--	36
	18	22	30	5	35
	19	--	36	--	36
	20	30	37½	--	37½
	21	28	37	4½	41½
	22	19	46½	5	51½
	23	8	20½	4½	25
	24	9	31	--	31
	25	10	16	--	16
	26	--	4	4	8
	27	--	17	4½	21½
	28	25½	27½	12	39½
	29	26	28½	9½	38
	30	28	21	13½	34½
	31	30	35	--	35
Aug	1	16	18	6	24
	2	20	21½	7	28½
	3	--	7½	8½	16
	4	8	17	9½	26½
	5	25½	24½	16	40½
	6	29½	29½	10½	40
	7	24	30½	6½	37
	8	25½	25½	7½	33
	9	38	26	10½	36½
	10	--	8	19½	27½
	11	28	16	13	29
	12	34	19	16½	35½
	13	34	25½	12	37½
	14	29	19	7½	26½
	15	32	81½	4	85½
	16	11	67½	4	71½
	17	12½	35	5½	39½
	18	--	4½	8	12½
	19	36	38	--	38
	20	29	17½	8½	26

TABLE 37 (Cont.)

DAILY LABOR SPENT BY CHOM FARM STAFFS

Date	Animal labor	Human labor		
		On farm	On coop. work	Total
	buf-hr	man-hr	man-hr	man-hr
Aug 21	32	18	6½	24½
22	19	28	7	35
23	17	41½	--	41½
24	8	16	4½	20½
25	--	19	7	26
26	--	14½	3½	18
27	--	21	15	36
28	--	4	16	30
29	--	2	22½	24½
30	--	14	14	28
31	--	8	4	12
Sept 1	--	8	9	17
2	--	27½	10	37½
3	--	12½	11½	24
4	--	19	7	26
5	--	21½	3½	25
6	--	19	--	19
7	--	17	--	17
8	--	12	--	12
9	--	24	--	24
10	--	6	--	6
11	--	11	3	14
12	--	9	--	9
13	--	6	--	6
14	--	2	--	2
15	--	8	--	8
16	--	3½	--	3½
17	--	4½	--	4½
18	--	2	--	2
19	--	2	3½	5½
20	--	2	12	14
21	--	2	7	9
22	--	2	11	13
23	--	2	7	9
24	--	2	--	2
25	--	2	14	16
26	--	2	14	16
27	--	2	14	16
28	--	16	--	16
29	--	2	7	9
30	--	2	--	2

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
Bangchan

TABLE 37 (Cont.)

DAILY LABOR SPENT BY CHOM FARM STAFFS

243
221
231
461
476
592

Date		Animal labor	Human labor		
			On farm	On coop. work	Total
		buf-hr	man-hr	man-hr	man-hr
Oct	1	--	2	--	2
	2	--	2	--	2
	3	--	2	--	2
	4	--	2	--	2
	5	--	2	--	2
	6	--	2	--	2
	7	--	2	--	2
	8	--	2	--	2
	9	--	2	--	2
	10	--	2	--	2
	11	--	2	--	2
	12	--	2	--	2
	13	--	2	--	2
	14	--	2	--	2
	15	--	2	--	2
	16	--	2	--	2
	17	--	2	--	2
	18	--	2	--	2
	19	--	2	--	2
	20	--	2	--	2
	21	--	2	--	2
	22	--	2	--	2
	23	--	2	--	2
	24	--	2	--	2
	25	--	2	--	2
	26	--	2	--	2
	27	--	2	--	2
	28	--	2	--	2
	29	--	2	--	2
	30	--	2	--	2
	31	--	2	--	2
Nov	1	--	2	--	2
	2	--	2	--	2
	3	--	2	--	2
	4	--	2	--	2
	5	--	2	--	2
	6	--	2	--	2
	7	--	5	--	5
	8	--	2	--	2
	9	--	2	--	2
	10	--	2	--	2

7: Janlekha X-4,5 (1948-1953)1956 AO7 Central Thai AO7
Bangchan

TABLE 37 (Cont.)

DAILY LABOR SPENT BY CHOM FARM STAFFS

Date		Animal labor	Human labor		
			On farm	On coop. work	Total
		buf-hr	man-hr	man-hr	man-hr
Nov	11	--	2	--	2
	12	--	2	--	2
	13	--	2	--	2
	14	--	2	--	2
	15	--	2	--	2
	16	--	2	--	2
	17	--	2	--	2
	18	--	2	--	2
	19	--	2	--	2
	20	--	2	--	2
	21	--	2	--	2
	22	--	2	--	2
	23	--	2	--	2
	24	--	2	--	2
	25	--	2	--	2
	26	--	2	--	2
	27	--	2	--	2
	28	--	2	--	2
	29	--	2	--	2
	30	6	5	--	5
Dec	1	6	2½	--	2½
	2	6	1½	--	1½
	3	6	1½	--	1½
	4	8	2	7	9
	5	--	--	--	--
	6	--	--	--	--
	7	--	--	--	--
	8	--	25½	--	25½
	9	--	33	--	33
	10	--	--	--	--
	11	--	12½	4½	17
	12	--	8	5	13
	13	--	16	22	38
	14	--	--	15	15
	15	10	17	16	33
	16	10	30	19	49
	17	20	33	10	43
	18	22	34	15	49
	19	28	24½	21	45½
	20	28	19½	24	43½

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
Bangchan

TABLE 37 (Cont.)

DAILY LABOR SPENT BY CHOM FARM STAFFS

Date		Animal labor	Human labor		
			On farm	On coop. work	Total
		buf-hrs	man-hr	man-hr	man-hr
Dec	21	--	4½	18	22½
	22	28	30½	21	51½
	23	28	43½	27½	71
	24	6	40	8	48
	25	6	21	18½	39½
	26	8	34½	--	34½
	27	8	24	18	42
	28	12	17½	24	41½
	29	--	14½	24	38½
	30	--	47	--	47
	31	--	14½	16	30½
Jan	1	6	23	24½	47½
	2	4	17	24	41
	3	6	26½	24	50½
	4	--	27½	32	59½
	5	12	25½	32	57½
	6	4	20	36	56
	7	12	25½	32	57½
	8	12	26½	32	58½
	9	--	34	15	49
	10	--	19½	16	35½
	11	--	25	9	34
	12	--	23½	18	41½
	13	--	23½	10	33½
	14	4½	32	11	43
	15	--	26	16	42
	16	--	10	9	19
	17	--	16½	15	31½
	18	6	21	9½	30½
	19	--	33	10	43
	20	14	25½	16	41½
	21	14	17½	10	27½
	22	--	32½	5	37½
	23	6	5½	9½	15
	24	--	74½	--	74½
	25	--	2½	8½	11
	26	--	22	--	22
	27	--	29½	--	29½
	28	20	47½	--	47½
	29	14	31	--	31
	30	20	24	--	24
	31	24	29	--	29

TABLE 37 (Cont.)

DAILY LABOR SPENT BY CHOM FARM STAFFS

*243
• 221
231
461
467
592

Date		Animal labor	Human Labor		
			On farm	On coop. work	Total
		Buf-hrs	man-hr	man-hr	man-hr
Feb	1	16	25½	--	25½
	2	16	39½	--	39½
	3	14	43½	--	43½
	4	--	34	--	34
	5	24	38½	--	38½
	6	8	22	--	22
	7	--	5	--	5
	8	8	10½	--	10½
	9	--	--	--	--
	10	--	--	--	--
	11	--	--	--	--
	12	--	--	--	--
	13	16	12½	--	12½
	14	--	16	--	16

243 423 464 427 from the homelot because much time and energy would be wasted in daily walking to the field.

It would seem, then, that most rice farm operators had little opportunity to obtain a farm size they thought best and had to accept what was due them. Thus, their role in choosing the size of business, which is the most important role, is also limited.

243 221 433 2. Limited role in management: Inasmuch as management refers to the function of putting the scheme into operation, Bangchan operators certainly have a large part to play. A good rice crop depends largely on the relationship between the height of the young plant and the rising water level. Since the rise of water level is highly seasonal, depending on local rains as well as rains elsewhere that affect the general water level, scheduling the farm work and seeing to it that the schedule is followed becomes a most important function of the farm operator.

243 433 Management, however, refers also to the function of making those adjustments in the business which are necessary in order to obtain the maximum economic returns from the farm business as a whole. Inasmuch as this latter function is concerned, the operator's role has been limited as in the case of the organizational function. As previously stated, under the present stage of technological development in rice production in this country, not only the points of diminishing return of both labor and capital (farm equipment, at the present state of technical development in the village)

*243 434 464 Some farmers had artificially reduced their operational cost by utilizing free labor of transient members of the family, who would not stay long if they were not adequately taken care of. These farmers would have to resort to pieceworkers or hired laborers when transient members decided to leave them.

*243 434 655 The farm price of paddy was adversely affected by the government control of rice export. It was estimated that huge profits of no less than 100 per cent had been made each year by the government through its monopoly over and later control of rice export and foreign exchange control. This will be dealt with separately later in this chapter.

*243 434 423 Although the average size of farm of 30.7 rai for Bangchan can be favorably compared to the average of 23.1 rai for the Central Plain, this does not mean that size of farm is not a problem contributing to low returns from rice. [464] It was pointed out earlier that there was a condition of disguised unemployment among Bangchan operators. Small size elsewhere simply indicates the widespread nature of the problem of disguised unemployment among farm operators in the Central Plain.

*243 434 Limited earning opportunity for incomes from sources other than rice is due to the fact that at the present stage of technological development no other crop can be profitably grown in rotation with rice because of agronomic limitations.

*243 434 The inundation period from the middle of September to early December, during which time no work is needed on

• 221

7: Janlekha X-4,5 (1948-1953)1956 AO7 Central Thai AO7
Bangchan

243 the rice enterprise, cannot be devoted to gainful utiliza-
221 tion of labor because: (a) there is not enough space in
434 the homelot, the only place above water; (b) poultry is not a competing crop as long as it is raised naturally in limited number. It becomes a competing crop when it is raised com-
[235] mercially. Commercial raising of poultry in Bangchan is handicapped by locational reasons (far from market and far from sources of feeds other than paddy). It is further handicapped by a higher chance of contamination which is true in such a geographical condition as prevailing in Bangchan; (c) another factor limiting an opportunity for growing a secondary crop during this period is that cash is most scarce in this time of the year and interest rate is highest. Any cash outlay for investment is thus discouraged. Farmers who have any cash at all will do much better by straight lending, or disguised lending in the form of petty trade on credit putting a high premium on credit purchases of 50 per cent extra on articles payable in two or three months; and (d) opportunity for wage earnings is also limited during this period because farmers do not need any help at this time of the year, and because successive rains prevent extensive public work and large scale construction.

It cannot be said, however, that there is no possible way for farmers to be gainfully employed during this period of inundation. Researches along this line are needed, ones that should take into consideration details of climatic, technical, economic, and social conditions of the village.

*243
166
221
434
467

The lean time from the middle of February to the end of May is devoted by some villagers, mostly young men, to wage earning outside the village. The size of this temporary labor migration depends on the job opportunities, and these job opportunities depend largely on personal contact. Seasonal off farm jobs are: (a) crude carpentry work usually on nonpermanent construction where cheap temporary labor is preferred; and (b) plantation work in the sugar cane region of Cholburi some eighty miles east of Bangkok.

Inherent Excess of Expenses over Incomes

434
426

The prevalence of debts in the form of credit purchases among Bangchan farmers indicates an excess of expenses over incomes. It has been shown that most cash loans were sought to clear high interest bearing credit purchase accounts, although some were for productive purposes. Even in this latter case, it has been observed that farmers usually borrowed no more than an amount that was immediately needed together with cash on hand to pay for the capital investment. This means that after such capital purchases there was less cash for the household and operating expenses, and so there would be a higher credit account to be settled in the following harvest.

Low incomes coupled with relatively high expenses leave little or no room for internal savings.

*243
434
178
433

The situation is aggravated by an increasing rate of consumption relative to the ability to produce. While